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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/536,688

05/27/2005

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EXAMINER

NGUYEN, TRI V

ART UNIT

PAPER NUMBER

1751

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08/17/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/536,688	Applicant(s) BARRERA ET AL.	
	Examiner Tri V. Nguyen	Art Unit 1751	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.138(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 May 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 17-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                       |                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                           | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of claims 17-26 in the reply filed on May 24, 2007 is acknowledged. Furthermore, Applicants cancelled claims 1-16 and 27-59.

### ***Claim Rejections - 35 USC § 102 & 103***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 17, 18, 22-24 and 26 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tour et al. (WO 02/060812).

Tour et al. disclose a composite synthesis with the steps of dispersing functionalized single walled carbon nanotube (SWNT) in a polymeric material and further treating the composite by applying heat (see at least pages 20-22). Tour et al. further disclose the feature of an in situ growing of the polymer (page 22). Table 3 lists a loading of 1-7 wt % loading of nanotubes (page 21). The examiner notes that the solvent and polymeric material can be construed as being the same component in claim 17.

Accordingly, the teachings of Tour et al. anticipate the material limitations of the present claims.

In the alternative that the above disclosure is insufficient to anticipate the above listed claims such as selection of a particular ingredient and loading proportions, it would have nonetheless been obvious to the skilled artisan to achieve the synthesis methodology, as the reference teaches each of the claimed ingredients within the claimed proportions for the same utility and such modifications are recognized as being well within the purview of the skilled artisan to yield predictable results.

5. Claims 17, 20, 22, 23, 25 and 26 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Xie et al. ("Ultraviolet-curable polymers with chemically bonded carbon nanotubes for microelectrochemical system applications." Smart Mater. Struct. 11, pages 575-580, published online on 23 July 2002).

Xie et al. disclose a synthesis of a UV curable composite via the steps of dispersing functionalized carbon nanotubes into toluene diisocyanate by ultrasonic vibrations followed by the addition of 2-hydroxyethyl methacrylate and the final product being cured with ultraviolet radiations (see experimental procedure section starting on page 576).

Accordingly, the teachings of Xie et al. anticipate the material limitations of the present claims.

In the alternative that the above disclosure is insufficient to anticipate the above listed claims such as selection of a particular ingredient, it would have nonetheless been obvious to the skilled artisan to achieve the synthesis methodology, as the reference teaches each of the claimed ingredients within the claimed proportions for the same utility and such modifications are recognized as being well within the purview of the skilled artisan to yield predictable results.

6. Claims 17, 18, 20 and 22-26 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Glatkowski et al. (US 2004/0071949).

Glatkowski et al. the synthesis of carbon nanotubes-polymer films by dispersing functionalized nanotubes SWNT in a solvent such as alcohols and mixing with a polymeric material that is UV curable (see at least parag. 40, 41, 50, 53, 59 and 86-91). The carbon nanotubes are loaded in the range of 0.2 to 5 wt % (see tables 1 and 2 on page 7).

Accordingly, the teachings of Glatkowski et al. anticipate the material limitations of the present claims.

In the alternative that the above disclosure is insufficient to anticipate the above listed claims such as selection of a particular ingredient or step sequence, it would have nonetheless been obvious to the skilled artisan to achieve the synthesis methodology, as the reference teaches each of the claimed ingredients within the claimed proportions for the same utility and such modifications are recognized as being well within the purview of the skilled artisan to yield predictable results.

#### ***Claim Rejections - 35 USC § 103***

7. Claims 17-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muisener et al. ("Effects of gamma radiation on poly(methyl methacrylate)/single-wall nanotube composite", J. Mater. Res., Vol. 17, pages 2507-2513, October 2002) in view of Margrave et al. (US 2001/0041160).

Muisener et al. disclose the synthesis of a single-wall nanotube/polymer composite by dispersing SWNT in dimethylformamide followed by introduction of poly(methyl methacrylate) (PMMA) precipitating the mixture and heating (see experimental section starting on page 2508).

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Muisener et al. further teach mixing of the composite and exposing the composite to gamma radiation. The load of SWNT is 0.26 wt % in the composite. However, Muisener et al. do not explicitly disclose the features of fluorinated single wall carbon nanotubes and in situ polymerization. Muisener et al. teach that the features of chemical modification of nanotubes and in situ polymerization of the composite are well known in the art (see introduction on page 2507). In an analogous art, Margrave et al. recites the feature of fluorinated single wall carbon nanotubes dispersed in alcohols to be used for composite (see at least parag. 83, 99, 128-135 and 198). Margrave et al. further disclose the advantageous properties of fluorinated SWNT such as electronic properties, dispersion and ease of further derivatizations (parag. 89-101). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method as taught by Muisener et al. One would have been motivated to gain the properties of fluorinated SWNT and particular polymers in a composite application.

8. Claims 18, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xie et al. as applied to the claim 17 above, and further in view of Margrave et al. (US 2001/0041160).

Xie et al. disclose the synthesis method of claim 17 but do not explicitly disclose the feature of fluorinated single wall carbon nanotubes dispersed in the particular solvents. In an analogous art, Margrave et al. recites the feature of fluorinated single wall carbon nanotubes dispersed in alcohols to be used for composite (see at least parag. 83, 99, 128-135 and 198). Margrave et al. further disclose the advantageous properties of fluorinated SWNT such as electronic properties, dispersion and ease of further derivatizations (parag. 89-101). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was

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made to modify the method as taught by Xie et al. One would have been motivated to gain the properties of the fluorinated SWNT in a composite application.

9. Claims 18, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glatkowski et al. as applied to the claim 17 above, and further in view of Margrave et al. (US 2001/0041160).

Glatkowski et al. disclose the synthesis method of claim 17 but do explicitly disclose the feature of fluorinated single wall carbon nanotubes dispersed in the particular solvents. Glatkowski et al. disclose the feature of functionalized SWNT dispersed in an alcohol solvent. In an analogous art, Margrave et al. recites the feature of fluorinated single wall carbon nanotubes dispersed in alcohols to be used for composite (see at least parag. 83, 99, 128-135 and 198). Margrave et al. further disclose the advantageous properties of fluorinated SWNT such as electronic properties, dispersion and ease of further derivatizations (parag. 89-101). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method as taught by Glatkowski et al. One would have been motivated to gain the properties of the fluorinated SWNT in a composite application.

10. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Xie et al., Glatkowski et al. or Muisener et al. in view of Margrave et al. as applied to the claim 17 above, and further in view of Cooper et al. ("Distribution and alignment of carbon nanotubes and nanofibrils in a polymeric matrix." Comp. Sci. and Tech. Vol 62, pages 1105-1112, June 2002).

Xie et al., Glatkowski et al. or Muisener et al. in view of Margrave et al. disclose the method of claim 17 but do not explicitly disclose incipient wetting of the polymer material followed by solvent removal and blending. In an analogous art, Cooper et al. disclose the

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feature of dispersing nanotubes in ethanol and PMMA particles followed by drying to remove ethanol and mechanical mixing (see experimental section starting on page 1106). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method as taught by Xie et al., Glatkowski et al. or Muisener et al. in view of Margrave et al. as the particular technique was recognized as part of the ordinary capabilities of one skilled in the art. Thus, such modifications are recognized as being well within the purview of the skilled artisan to yield predictable results to achieve the dispersion of nanotubes in a particular polymer to gain the mechanical and electronic properties of the composite application.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Geng et al. ("Fabrication and properties of composites of poly(ethylene oxide) and functionalized carbon nanotubes." Adv. Mater. Vol 14, pages 1387-1390, Oct 2002).
- b. Harutyunyan et al. (US 2003/0042128) teach the feature of using radiation to modify nanotubes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tri V. Nguyen whose telephone number is (571) 272-6965. The examiner can normally be reached on M-F 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on (571) 272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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August 2, 2007

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